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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 10/720,097 | 11/25/2003 | Miwa Kozawa | 032132 | 4454 |
| 38834 7590 08/04/2010 WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036 | | | | |
| EXAMINER | | | | |
| CHACKO DAVIS, DABORAH | | | | |
| ART UNIT | | PAPER NUMBER | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentmail@whda.com

Office Action Summary

Application No.

10/720,097

Applicant(s)

KOZAWA ET AL.

Examiner

DABORAH CHACKO DAVIS

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7 and 10-22 is/are pending in the application.
- 4a) Of the above claim(s) 21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 10-20 and 22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-5, 7, 10-20, 22, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, at lines 10-11, claim 20, at lines 12-13, and claim 22, at lines 11-12, recite the following,

wherein the nonionic surfactant is at least one of polyoxyethylene monoalkyl ether compounds ~~and phenol ethoxylate based compounds~~ and PC-6.

The instant specification, on pages 31-32, discloses the following,

"PC-6" represents a nonionic surfactant (a polyoxyethylene monoalkyl ether surfactant available from Asahi Denka Co., Ltd.).

and "PC-6" represents a nonionic surfactant (a polyoxyethylene monoalkyl ether surfactant available from Asahi Denka Co., Ltd.).

The term "PC-6" is conventionally well known as polycarbonate resin. The term "PC-6" is indeterminable in its scope. The instant specification does not provide any examples of the term such that a person of ordinary skill in the art would have promptly recognized the meaning of the term. One of ordinary skill in the art cannot ascertain the

metes and bounds of the claimed term and are not now known. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-5, 7, 10-20, and 22, are rejected under 35 U.S.C. 103(a) as being unpatentable over EP1152036 (Kanda et al., hereinafter referred to as Kanda) in view of U. S. Patent No. 5,173,393 (Sezi et al., hereinafter referred to as Sezi) and U. S. Patent No. 5,326,675 (Niki et al., hereinafter referred to as Niki).

Kanda, in [0001], [0006], [0007], [0008], [0016], [0020], [0023], [0024], discloses a process for forming a resist pattern by forming a resist pattern on a substrate (underlying object), heating the resist pattern formed on the substrate to a temperature of 50 to 140°C, applying a water-soluble resin composition (a resist pattern thickening material) on the resist pattern, wherein the resist pattern thickening material includes a metal-free surfactant (second surfactant). Kanda, in [0038], discloses that the fine resist pattern formed after the thickening process and developing, can be used as a mask to form trenches or holes in the underlying semiconductor substrate (by etching thru the mask). Kanda, in [0024], discloses that resist pattern to be thickened (resist pattern) is coated with a coating layer (resist pattern to be thickened) and is then

subjected to a heat treatment (prebaking) (claims 1-3, 7, 20, and 22). Kanda, in [0009], [0011], [0012], [0016], [0018], [0019], [0022], discloses that the resist pattern thickening material is a water-soluble resin composition that includes i) a resin such as polyvinyl alcohol, ii) a crosslinking agent such as a melamine derivative, iii) an organic solvent such as alcohol solvents, ester solvents, and ether solvents (claims 10-15). Kanda, in [0024], discloses that the resist pattern thickening material (coating material) is developed in pure water, after applying the coating material onto the resist pattern (claims 16-17). Kanda in [0023], discloses that the resist pattern material is an ArF resist (resist exposed using an ArF excimer laser) (claim 18).

The difference between the claims and Kanda is that Kanda does not disclose applying a first surfactant on the resist pattern to be thickened. Kanda does not disclose that the resist pattern is heated after applying the surfactant. Kanda does not disclose that the surfactant composition is a metal-free surfactant such as a non-ionic surfactant and is selected from the group recited in the claim. Kanda does not disclose that the surfactant composition includes a solvent that does not dissolve the resist pattern to be thickened, and that the solvent is water (claims 4-5). Kanda does not disclose that the ArF resist material is selected from the group recited in claim 19.

Sezi, in col 6, lines 60-68, in col 8, lines 9-11, discloses that a surfactant solution that is metal-free, and is non-ionic, such as alcohol is applied on the photoresist structure, and the treated photoresist structure is dried by heating. Sezi, in col 7, lines 30-58, discloses that the photoresist structure is treated with a reactant that comprises isopropyl alcohol (non-ionic surfactant) and has a solvent such as water (that does not

dissolve the resist pattern). Sezi, in col 3, lines 3-6, in col 4, lines 44-60, discloses that the photoresist material that forms the photoresist structure is derived from polymerization or copolymerization of olefinically unsaturated anhydrides, and that the anhydrides can be cyclic.

The difference between the claims and Kanda in view of Sezi is that Kanda in view of Sezi does not disclose the non-ionic surfactant recited in the claims 1, 20, and 22.

Nikki, in col, 3, lines 44-47, in col 7, lines 34-36, and in col 8, lines 53-57, discloses that a coating layer composition that includes a nonionic surfactant such as polyoxyethylene alkyl ether compound.

Therefore, it would be obvious to a skilled artisan to modify Kanda by employing the process of treating the resist pattern to be thickened with a surfactant solution as suggested by Sezi and use the nonionic surfactant suggested by Niki in the surfactant solution because Sezi, in col 7, lines 3-8, and in col 8, lines 38-55, discloses that the resultant photoresist structure has an increased etch resistance and is therefore suitable to be used as an etch resistant mask, and Niki, in col 8, lines 53-64, discloses that using the non-ionic surfactant such as polyoxyethylene alkyl ether compounds is practical and that using them in the coating composition that coats the radiation sensitive layer (photoresist) prevents precipitation of polymers during subsequent processings. It would be obvious to a skilled artisan to modify Kanda by employing the resist pattern material suggested by Sezi because Sezi, in col 4, lines 44-55, discloses

that the resist material used for forming the photoresist structure includes reactable groups such as anhydrides that do not exhibit an increased absorption of DUV light.

Response to Arguments

5. Applicant's arguments, see Amendment, and Remarks, filed May 17, 2010, with respect to claims 1, 20, and 22, have been fully considered and are persuasive. The 103 rejection made over the claims in the previous office action (paper no. 20090604) has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Niki. See paragraph no. 4, above.

A) Applicants argue that none of the references teaches the non-ionic surfactants recited in the independent claims, i.e., at least one of polyoxyethylene monoalkyl ether compounds and PC-6.

Neither Kanda nor Sezi nor Hallock is relied upon to disclose the presently amended non-ionic surfactants. Niki is depended upon to disclose the use of non-ionic surfactants such as a polyoxyethylene monoalkyl ether compounds i.e., PC-6. See paragraph nos. 2, and 4, above.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Daborah Chacko-Davis/
Primary Examiner, Art Unit 1795

July 30, 2010.